

CLAIMS

1. A repeat field detecting apparatus which is used in a video progressive conversion reproducing apparatus of converting a video input signal of interlace scheme into a video signal of progressive scheme and which detects whether said video input signal is a repeat field where the same video image is outputted repeatedly or an ordinary field which is other than said repeat field, said repeat field detecting apparatus comprising:

RF determining means of identifying a repeat field having a predetermined distance from said video input signal, on the basis of a discrepancy pixel number which is the number of the pixels having discrepancy between the pixel information of a field of said video input signal and the pixel information of a field of said video input signal having a predetermined distance from the former-mentioned field of the video input signal;

M/N ratio calculating means of obtaining an N component which is the number of discrepancy pixels between said repeat fields and an M component which is the number of discrepancy pixels between at least a pair of fields which are other than said repeat fields and have said predetermined distance from each other, and then calculating an M/N ratio which is the ratio of said M component to said N component;

RF determination reliability calculating means of

outputting the reliability of the determination result of said first RF determining means on the basis of the output of said M/N ratio calculating means; and

M/N ratio adaptive repeat field confirming means of confirming the output of said first RF determining means as the determination result on the basis of said reliability outputted from said RF determination reliability calculating means.

2. A repeat field detecting apparatus according to claim 1, wherein

said predetermined distance is a distance having one field therebetween, and wherein

said at least a pair of fields are pairs of four adjacent fields.

3. A repeat field detecting apparatus according to claim 1, wherein

said at least a pair is two pairs or more, and wherein

said M component is the average between the discrepancy pixel numbers of said two pairs or more of fields.

4. A repeat field detecting apparatus according to claim 1, wherein said M/N ratio adaptive repeat field confirming means determines the field as an ordinary field until five fields have elapsed from the initial state, and wherein after five or more

fields have elapsed from the initial state, said M/N ratio adaptive repeat field confirming means determines the field as an ordinary field when the output of said RF determination reliability calculating means is smaller than a predetermined threshold value, and sets the output of said first RF determining means as the determination result when the output of said RF determination reliability calculating means is greater than or equal to said predetermined threshold value.

5. A repeat field detecting apparatus according to claim 1, wherein said M/N ratio calculating means comprises:

discrepancy pixel history means of storing the history of said discrepancy pixel numbers for the past five fields including the present value at each time when said video input signal advances by one field;

N component detecting means of setting the minimum value among the values stored in said discrepancy pixel history means as an N component indicating the amount of the noise component on the time axis of the input video signal, at each time when said video input signal advances by one field;

M component detecting means of subtracting the value detected by said N component detecting means from the sum of all the five values stored in said discrepancy pixel history means, then dividing the value by four, and then setting this result as an M component indicating the motion component on the

time axis of the video signal, at each time when said video input signal advances by one field; and

calculating means of calculating an M/N ratio which is the ratio of said M component to said N component.

6. A repeat field detecting apparatus according to claim 1, wherein said RF determination reliability calculating means returns a value indicating the reliability of said first RF determining means corresponding to the output value of said M/N ratio calculating means, on the basis of previously-obtained information indicating the relation between the reliability of said first RF determining means and the output of said M/N ratio calculating means and on the basis of the output provided from said M/N ratio calculating means.

7. A repeat field detecting apparatus according to claim 1, wherein said first RF determining means comprises:

period position identifying means of being initialized by an initialization input, then being incremented by one at each time when said discrepancy pixel number is received in association with the elapse of one field, and then returning to the initial value after the elapse of five fields, so as to output a period position;

initial period checking means of outputting whether said period position identifying means has advanced by one or more

periods or not;

first through fifth accumulated averaging means of calculating the average of said discrepancy pixel numbers when said period position identifying means indicates the n-th field (n=1 through 5), so that the average is stored into the n-th accumulated averaging means; and

determining means of determining the field as a repeat field when the output value selected from the output values of said first through fifth accumulated averaging means in correspondence to the output value of said period position identifying means is the minimum one among the output values of said first through fifth accumulated averaging means, and otherwise determining the field as an ordinary field.

8. A repeat field detecting apparatus according to claim 7, comprising

scene change detecting means of determining the presence or absence of a scene change in said video input signal on the basis of said discrepancy pixel number, wherein

said initialization input is an input provided from said scene change detecting means when the output of said scene change detecting means indicates a scene change, and wherein

said n-th accumulated averaging means stores said discrepancy pixel number when said initial period checking means is in the initial state and when said period position identifying

means indicates the n-th field, and stores the average between said discrepancy pixel number and the value stored in said n-th accumulated averaging means when said initial period checking means is in a state other than the initial state and when said period position identifying means indicates the n-th field, and further resets said period position identifying means and said initial period checking means when the output of said scene change detecting means indicates a scene change.